Photzy

5 THINGS YOU PROBABLY DIDN'T KNOW ABOUT CAMERA SHUTTER SPEED

Quick Guide

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There are a few things that are commonly discussed about the use of the camera's shutter speed.

They include:

- A fast shutter speed stops action
- A slow shutter speed creates motion blur
- If you have a slow shutter speed, and you are unprepared for it, you can accidently blur your photograph through camera shake.

Outside of these three commonly discussed attributes, you'll find very little knowledge about how the shutter speed works and why.

Today, we are going to discuss that!

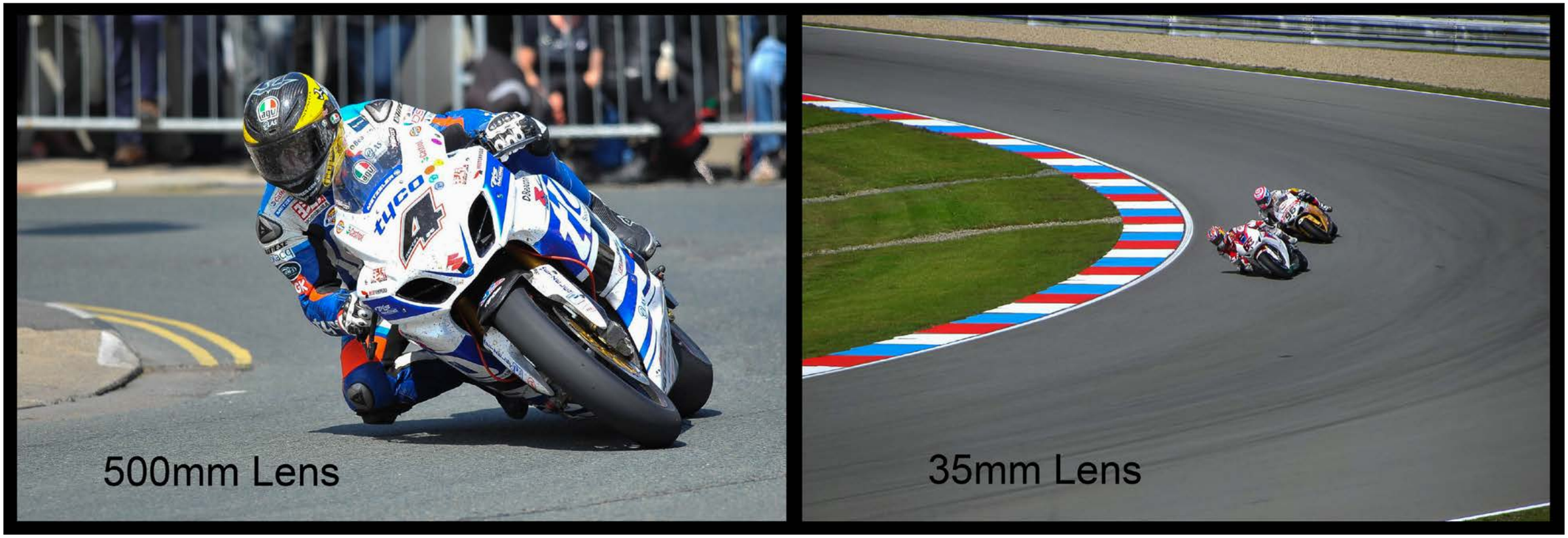
When you finish this guide you will have a better understanding of the following five attributes in the use of the camera's shutter speed:

- How the focal length of the lens affects the attributes of the chosen shutter speed
- How the angle of movement, relating to the subject and relative to the camera position, affects the attributes of the chosen shutter speed
- How to judge your shutter speed selection based on the speed and distance of the object being photographed
- Panning and how it relates to shutter speed
- Reciprocity failure and whether you need to be concerned with it

Finally, we will analyze several photographs. We will discuss how the shutter speed was used in the photograph and gain some insight into how to put the shutter speed to creative use (beyond the normal stuff).

CHAPTER ONE – HOW THE FOCAL LENGTH OF THE LENS AFFECTS THE ATTRIBUTES OF THE CHOSEN SHUTTER SPEED

The easiest way to begin this discussion is to look at these two photographs.



In both scenes, the motorcycles are traveling at the same speed. The angle of movement relating to the subject and relative to the camera position is almost identical. Yet, the necessary shutter speed to "freeze the action" for these two photographs would be widely different.

Why?

If (in both scenes) the motorcycles are traveling at 100 mph, wouldn't the logical thought be that you must use the fastest shutter speed possible to freeze the action?

In order to understand this concept, we have to understand something about how lenses work.

The left photograph was created with a 500mm telephoto lens.

What does a telephoto lens do? It brings things closer, right? That is a generalized answer.

What a telephoto lens really does is "magnify" the image it is resolving.

Magnify is the key word because it not only magnifies the image, but it also magnifies movement.

This is why it is harder to handhold your camera when you've mounted a telephoto lens and still get a sharp picture. The camera movement is being magnified.

But a less discussed issue is that it also magnifies the movement of the subject.

The shot on the right (35mm lens) could freeze the action at a much slower shutter speed than the shot on the left.

What shutter speed would be necessary to freeze the action in these two scenarios?

It's really impossible to tell you. There are too many factors at work.

Key Lesson: What you need to gather from this is that you don't always need the fastest shutter speed possible when something is moving. You may not need to drive up your ISO or open up your aperture and lose depth of field. You may not need a shutter speed of 1/5000th of a second if you're shooting with a 50mm lens, whereas you might if you were to switch lenses to a 300mm lens. I always start an action (motion) photo shoot with a little experimentation to find the sweet spot (stopping action and correct depth of field) for my shutter speed.

CHAPTER TWO – HOW THE ANGLE OF MOVEMENT, RELATING TO THE SUBJECT AND RELATIVE TO THE CAMERA POSITION, AFFECTS THE ATTRIBUTES OF THE CHOSEN SHUTTER SPEED

Again, let's start with some comparison photographs.

In both scenes, the subjects are moving at relatively the same speed. The same focal length lens was used for both shots. Yet, we would need a much faster shutter speed to freeze the action for the photograph on the right than we would for the one on the left.

Why?

The appearance of movement is exaggerated when that movement is in a perpendicular line to our vision.

Think about it.

If a train is traveling at 100 mph, and you're standing off to the side of the tracks watching it go by, it will be moving so fast you can barely make out the cars. If you're standing on the tracks, and watching the train moving directly at you, at 100 mph, it will look like it's barely moving at all!

💎 **Key Lesson:** When you're out photographing activity, take into consideration the direction of the activity relative to your position. If you're photographing a horse race, and you want to see the strain on all the horses' faces as they round the final turn, pick a camera position where the angle of movement, relative to your position, will be straight-on. Or, if you want to capture the faces sharply but also want to see the blur of the pounding hooves, pick a position where they will pass in a perpendicular position to the camera.

CHAPTER THREE – HOW TO JUDGE YOUR SHUTTER SPEED SELECTION BASED ON THE SPEED AND DISTANCE OF THE OBJECT BEING PHOTOGRAPHED

Would a shutter speed of 1/125th of a second capture this shot sharply?

I bet your initial reaction would be to say no, right? It looks like it was shot with a telephoto lens. The subject is traveling perpendicular to the camera. It looks like the motorcycle is traveling at 100 mph.

But, what if it's not traveling that fast? What if it's only going 40 mph and this was shot with a lens closer to a normal focal length, and then it was cropped? Could a shutter speed of 125th of a second freeze the action? Sure it could!

Here, we have a motor scooter that probably maxes out at a speed of 40 mph; could we be guaranteed a sharp image, at a shutter speed 125th of a second, as the scooter passed by? No, not necessarily.

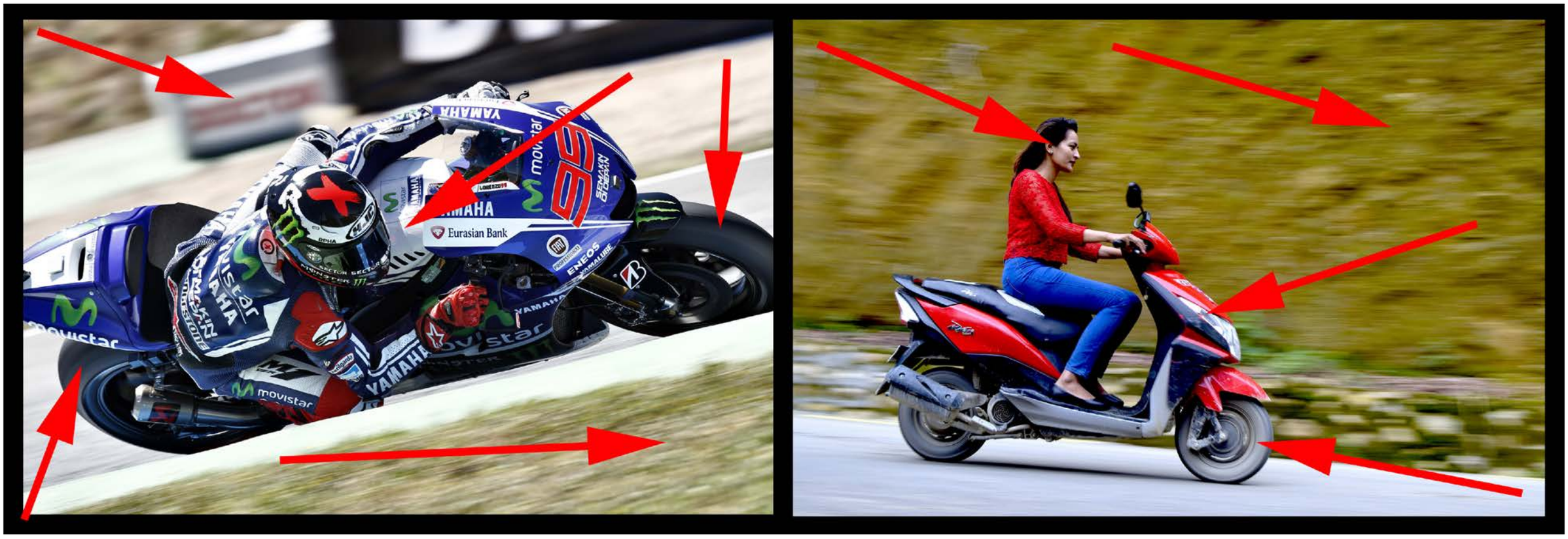
Let's say that we have the same normal focal length lens, which we used for the previous shot of the racing motorcycle, only now we are mere feet away from the motor scooter as it passes by at 40 mph. We would have to have a faster shutter speed to stop the action.

Key Lesson: Movement is accentuated the closer your camera is to the subject that is moving. If you are using the same lens, and photographing the same moving subject, you will need a faster shutter speed to stop the action at 10 feet away from the subject than you would at 30 feet away from the subject. Take into account your distance from the subject when choosing a shutter speed.

CHAPTER FOUR – PANNING AND HOW IT RELATES TO SHUTTER SPEED

You are probably familiar with the term "panning" if you've been involved with photography for any length of time.

Most descriptions of panning describe picking a slower shutter speed and then moving the camera at a similar speed to the subject as it passes by perpendicular to your camera's POV.



Both of our (previously viewed) photographs indicate that the panning technique was used. I've put in arrows that show the maximum level of blur, the mid-level blur, and the exact point of focus.

Interestingly enough, I think the photograph on the right is an actual pan. The photograph on the left looks like a composite, that was put together to make it appear like a panned shot.

Key Lesson: When using the panning technique, begin by evaluating the speed of the moving object. If the subject is your dog running by in the yard, then 1/60th of a second might be a perfect shutter speed for panning. If the subject is a pack of Formula One racecars going by at 230 mph, you may need to pan at a shutter speed of 1/1000th of a second or faster.

Recommended Reading: Want to learn how to produce stunning images using slow shutter speeds? Grab a copy of Photzy's Complete Guide to Long Exposure Photography.

CHAPTER FIVE – RECIPROCITY FAILURE. WHAT IS IT AND WHEN MIGHT IT CONCERN YOU?

Here is a definition of ***reciprocity failure*** (courtesy of Oxford Dictionaries).

> **Definition:** ***Reciprocity failure*** is the failure of an emulsion to follow the principle that the degree of darkening is constant for a given product of light intensity and exposure time, typically at very low or very high light intensities.

That's a lot of fancy language that says this: "If you're photographing with film, and your exposure time (shutter speed) becomes longer than one second, the film will begin to experience a loss of sensitivity, and you can no longer rely on the square factor for exposure calculation." In other words, if you're shooting at 2 seconds and you determine that you need one more stop of exposure, doubling the exposure time to 4 seconds may not give you one more stop of exposure. It might actually take something like 5 seconds (this is just an example).

Film is always sold with a data sheet that would give an exposure factor for reciprocity failure. This allowed the photographer to calculate the exposure adjustment.

Digital photography does not suffer from reciprocity failure.

Why?

Reciprocity failure was a chemical issue, and in digital photography we don't use chemicals.

I mention it here because someday you may decide that you would like to try shooting film.

Let's take a look at some photographs and analyze the use of the camera's shutter speed.

What do you think was happening with the shutter speed in this image? Was it a fast moving train? No, it wasn't.

This shot is pretty interesting in its use of shutter speed.

The camera was held very steady (likely on a tripod). The lens was a moderate wide-angle to normal zoom. A slow shutter speed, likely around 1 second was chosen. The photographer fired the shutter and immediately zoomed the lens from wide to normal.

This blurred the image because of the lens movement. (So, not subject movement, not camera movement, but lens movement!) This technique is known as "racking" the lens.

Why does the train track appear sharp? The angle of movement (the zooming lens), relative to the subject (the train tracks) and relative to the camera position, is straight on versus perpendicular.

This is a fun technique. You should give it a try.

Here is a question. Do you think this shutter speed was more likely to be 1 second or 1/4 of a second? I think it was more likely closer to 1/4 of second. I say that because the people are relatively in focus.

Why does the ride look like it is spinning at 1000 mph?

A Short Story...

Years ago, I took a photography workshop with a photographer who was known for his automotive work. He was a master at lighting and movement.

He used hot lights (continuous lighting, not electronic flash) to perfectly light up a Chevy Camaro that was sitting in his studio.

Behind the Camaro was a painted backdrop that looked like a mountain scene.

The car sat on rollers, and there was a driver inside the car. The engine was not on, but the rollers were motorized to spin the tires.

He used a shutter speed of around five seconds.

The painted backdrop was on wheels.

When he clicked the shutter, there were two photo assistants that rolled the backdrop back and forth (no more than 6 inches total) during the entire exposure.

Now, bear this in mind: this was all before Photoshop.

When he shared his film with us the next day, it was nothing short of mind-blowing.

It looked like a perfectly studio-lit car was screaming down a mountain road at breakneck speed.

This is the power of your shutter speed – when you have the right knowledge on how to use it!

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There is some major action happening here. If you were taking this photograph, what would you be considering? You probably are using a telephoto focal length lens to get that close to the horse and rider. There is speed, but probably not as fast as you might think. The angle is “almost” perpendicular to the camera position. Would depth of field be important here? I say, yes, very much so.

Key Lesson: The reason that having the ability to evaluate a photographic situation and then choose an appropriate shutter speed is so important, is because (in a very distinct way) it’s going to affect your DOF (depth of field). In the rodeo scenario, would the camera settings of 1/8000th of second at f/2.8 be better, worse, or as good as the camera settings of 1/500th of a second at f/11? If 1/500th of a second stops the action, then it would be a better choice because of the increased DOF. What if 1/500th of a second didn’t quite freeze the action? You could then employ the panning technique to squeeze additional sharpness out of that 1/500th of a second shutter speed.

Self-Check Quiz:

1. What focal length lens would require a faster shutter speed to freeze the action: 200mm or 75mm?

2. What does a telephoto lens do that affects shutter speed choice?

3. Which scenario would allow a slower shutter speed? Your child running from left to right, right to left, or straight at you.

4. True or False: Your distance from camera to a moving subject makes no difference on the choice of shutter speed.

5. True or False: You can use the panning technique at 1/60th of a second, but not at 1/1500th of a second.

6. You're photographing a speedboat. Your first shot is from the shore, and you're approximately 200 feet from the boat as it passes. You then move to the end of a dock. The boat passes by again. This time you're about 60 feet from the boat. What would you do to your shutter speed to maintain the same level of critical sharpness?

7. If a subject is still, shutter speed is not a concern, even if the camera is moving.

8. What is it called when you use a long shutter speed and then zoom the lens during the exposure?

9. Reciprocity failure is a factor when you're using what?

10. Why is your knowledge about shutter speed important to your use of your camera's aperture?

Shooting Assignment: Take your camera equipment outside to a park. Bring a helper, or two, with you. (The kids will love this.) Use your helper(s) as the subject. Holding the camera steady (on a tripod would be best), ask them to run by while you take photographs. First, have them run perpendicular to your camera's POV and about 20 feet in front of you. Take five photos using each of the following shutter speeds: 1/60, 1/125, 1/250, and 1/500. Repeat the process with them at about 40 feet from the camera. Repeat the process with them running at an angle past the camera. Finally, have them run directly at the camera. Study your results.

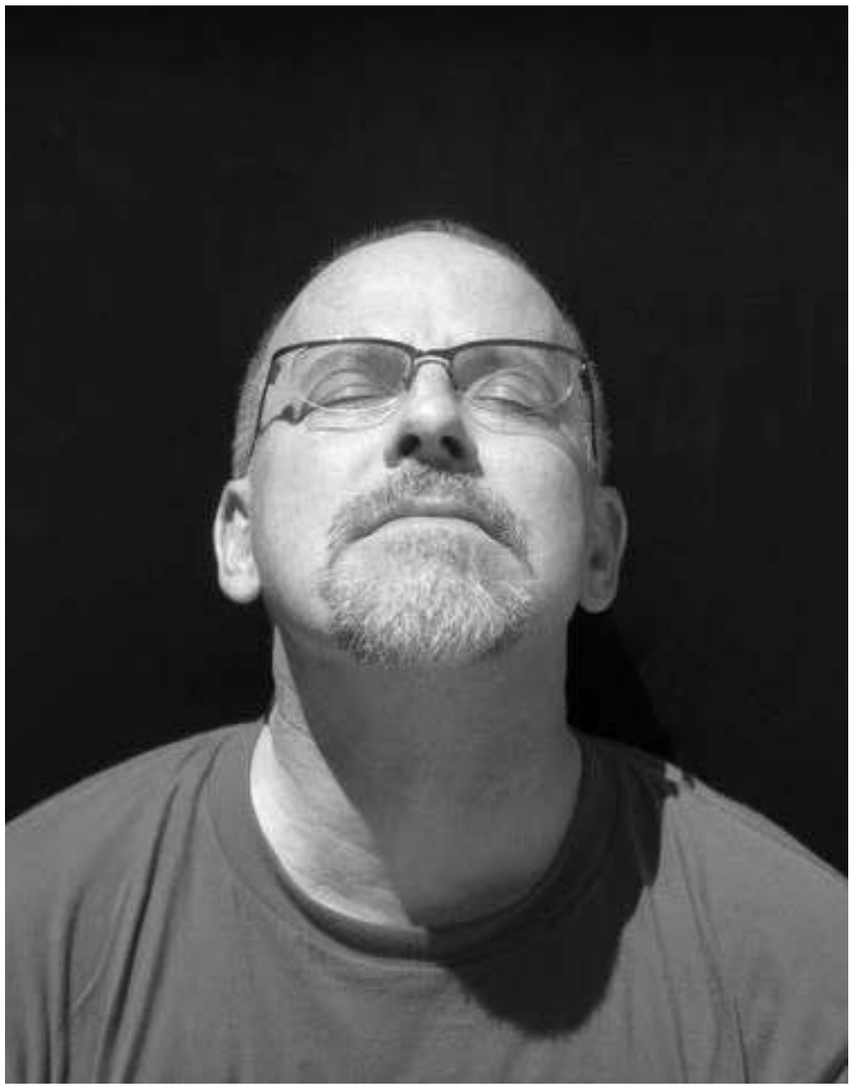
Recommended Reading:

- Complete Guide to Long Exposure Photography
- The Art of Metering and Exposure
- How to Avoid Blurry Photographs

Recommended Videos:

- Camera Aperture & Shutter Speed
- Shutter Speed Explained

ABOUT THE AUTHOR



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